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Original Article

The effect of self-efficacy and self-management training on efficacy and stress in diabetes mellitus patients

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A B S T R A C T

Background: Quality of life in patients with diabetes mellitus still tends to be low. This is caused by low self-efficacy and self-management and is followed by a condition that connects the two variables in the form of stress. Therefore, there is a need for efficacy and self-management training in patients with diabetes mellitus.

Objective: The purpose of this study was to analyze the effect of self-efficacy and diabetes self-management training on diabetes mellitus patients.

Methods: This is a quasi-experimental study with a design without a control group; as many as 34 people with diabetes were included in the study. Stress and efficacy levels were measured before and after being given diabetes self-management and efficacy training. The Wilcoxon test analyzed data..

Results: Before training, the average self-efficacy score was 44.21, while after training was 58.76, p<0.0001. The average stress score before training was 44.41; after training, it decreased to 30.29, p<0.0001.

Conclusion: Diabetes self-efficacy and self-management training increases efficacy and reduces stress in diabetes mellitus patients.

INTRODUCTION

Achievement of good health is the output of successful efforts at self-management in patients with diabetes mellitus. The basis for this success is if there is improving self-efficacy and decreased stress.[1] Self-efficacy, stress, and self-management in patients with diabetes mellitus are variables that must be handled together. Self-efficacy is needed to deal with stress healthily and make adjustments in self-management.[2] Low self-management will cause the quality of life of patients with diabetes mellitus to worsen.[3] Based on previous studies, the quality of life of patients with diabetes mellitus is still low.[4,5]

In previous studies, some still experienced low self-management of diabetes mellitus. A systematic review and meta-analysis of 21 studies separately showed poor self-management of diabetes mellitus patients between 37.06 - 68.58%, and the mean was 49.79%.[6] Several factors that can cause decreased self-management in diabetic patients are self-efficacy and stress.[1] In previous studies, it was also found that there was still low self-efficacy in patients with diabetes mellitus. A study in Jordan of patients with diabetes mellitus showed that the majority experienced low self-efficacy.[7] Self-efficacy improvement is used to improve behavior in the health sector in several diseases, one of which is diabetes mellitus.[8]

Likewise, previous studies showed that there was still a high tendency to stress in patients with diabetes mellitus. In one 2014 study, 62.9% of patients had this condition.[9] Another study during the COVID-19 pandemic in 2022 showed an increase in the number of people experiencing stress in diabetes mellitus patients, which was 79%.[10] Stress in patients with diabetes mellitus is one of the factors related to obedience behavior in undergoing treatment because it can cause the regulation of inflammation that occurs in the body to decrease and, if uncontrolled, will cause death.[11,12] Therefore, self-efficacy will make a difference in the effects of perceived stress. An individual with high levels of self-efficacy will experience less stress. Self-efficacy will allow individuals to do extraordinary things by

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using skills in dealing with obstacles to be more assertive in facing problems.[13]

In several previous studies, there has been the development of self-efficacy training in patients with diabetes mellitus. Several studies showed efficacy training in diabetes mellitus patients using web-based and mobile health technology. However, it cannot last long because the absorption of information by patients is limited.[14,15] On the other hand, based on previous studies, there had also been self-efficacy training in diabetes mellitus patients, but the content of the training was in the form of efforts to improve coping skills. One study has trained on disease recognition, self-care principles, stress management, communication skills, cognitive and behavioral transformation, and problem-solving, and has produced positive effects.[16] Another study provided sub-topics on efforts to develop self-awareness skills, problem-solving, managing anger, solving stressful problems, thinking about positive things and hope for the future, and producing an excellent influence.[17]

Other studies have shown that diabetes self-management training can significantly affect self-efficacy and stress. A study on training using DM calendar application as diabetes self-management education in diabetes mellitus significantly affects self-efficacy.[18] Another study on diabetes self-management training had a significant effect on reducing stress.[19] Studies in the past have been good but based on Bandura's theory that growing high self-efficacy requires sub-themes described in his theory. Therefore, the researchers tried to combine self-efficacy training using the theory including the theme of success in oneself, getting a history of achieving success in people who have problems, how to get encouragement from the closest people, and the creation of emotional and physical states that were presented in various methods with guidance directly and simultaneously with diabetes self-management education. This study aimed to analyze the effect of self-efficacy training and self-management on self-efficacy and stress in patients with diabetes mellitus.

METHOD

Study Design

This is a quasi-experimental study with a pre-post-test design.[20]

Setting and Respondents

The study was carried out from July to August 2022 using a population of all people with diabetes mellitus in the Work Area of the Mencirim Health Center, Deli Serdang Regency. The number of samples in this study was 34, calculated using the sample formula, with the criteria of adult patients aged 18 years suffering from diabetes mellitus, body temperature during activity 37^0C, full awareness, communicating using good Indonesian language sampling technique was simple random sampling.[21]

Experimental Procedures

Each respondent received one day of diabetes self-efficacy and self-management training. This training used a rapid intervention so that after completing activities on the same day, self-efficacy and stress were measured using the same questionnaire. The first theme in self-efficacy training and self-management of diabetes mellitus was the description of diabetes mellitus, including the sub-themes definition of diabetes mellitus and pathophysiology, signs and symptoms, as well as diagnosis, complications, and treatment of diabetes mellitus.

The second theme was self-management of diabetes mellitus with sub-themes of diet, physical activity, foot exercises, foot care, monitoring blood sugar levels, and stress management. Various methods were used, including lectures, discussions, questions and answers, demonstrations, and demonstrations using aids such as newspapers, blood sugar checkers, and soft classical music using tape.

The third theme, self-efficacy in diabetes mellitus, includes the sub-theme of the concept of self-efficacy, the application of self-efficacy in dealing with daily problems, and specifically diabetes mellitus using the application of Bandura's theory where efficacy comes from 4 things, namely the experience of success, experience of others, persuasion social and physiological and emotional states, where this sub-theme is combined with theory in the field of nursing and health. Various methods were used, including lectures, discussions, questions and answers, and demonstrations with the help of soft classical music using tape.

The Variable, Instrument, and Measurement

This study has variables including self-efficacy and stress. The instrument used to measure self-efficacy is the Diabetes Management Self-Efficacy Scale which consists of 15 questions with a parameter score from the lowest 15 to the highest 75.[22] Stress was measured by a Subjective Units of Distress Scale (SUDS) questionnaire consisting of a scale of 0 to 100, where every 10 intervals there was a statement of stress.[23] The process of data collection by direct interviews to respondents.

Ethical Consideration

This research has been approved by research ethics commission number 01.0110/KEPK/Poltekkes Kemenkes Medan 2022.

Statistical Analysis

The analysis to see the effect of self-efficacy training and self-management on efficacy and stress was tested with the Wilcoxon test.

RESULTS

Respondents, on average, are old, mostly married, most have an elementary school education, low income, work as housewives, on average, recently had diabetes (Table 1). Before training, the average self-efficacy score was 44.21, while after training was 58.76, p<0.0001. The average stress score before training was 44.41; after training, it decreased to 30.29, p<0.0001. From the analysis results, it can be interpreted that self-efficacy training can significantly increase the self-efficacy of DM patients. Self-management can increase self-efficacy and reduce stress levels in diabetic patients (Table 2).

Table 1. Characteristics of Respondents (n=34)

Characteristics	Result
Age, (mean±SD), yrs	(59.97±10.23)
Sex	
Man	8 (23.5%)
Woman	26 (76.5%)
Marital Status	
Not Married Yet	1 (2.9%)
Married	24 (70.6%)
Widower/Widow	9 (26.5%)
Education	
No School	1 (2.9%)
Primary School	16 (47.3%)
Junior High School	3 (8.8%)
Senior High School	13 (38.2%)
College	1 (2.9%)
Income, Rp	
< 2.500.000	26 (76.5%)
2.500.000 – 5.000.000	7 (20.6%)
> 5.000.000	1 (2.9%)
Profession	
Housewife	21 (61.8%)
Private employees	1 (2.9%)
Entrepreneur	6 (17.6%)
Retired	2 (5.9%)
Odd jobs	4 (11.8%)
Long Time Experiencing Diabetes, (mean±SD) yrs	(2.39±4.86)

Table 2. Differences in Self-Efficacy and Stress Pre-Post Test

Variable	Mean±SD	Mean Diff	p-value
Self-Efficacy			
Pre-test	44.21±10.75	14.56	0.0001
Post-test	58.76±5.09		
Stress			
Pre-test	44.41±15.01	14.12	0.0001
Post-test	30.29±14.87		

DISCUSSION

The findings in this study indicated a significant effect of self-efficacy training and self-management in patients with diabetes mellitus (p<0.0001). We can observe this phenomenon based on the study's results; there was a significant difference in the mean of the patient's self-efficacy after the training, which was 14.56. Through training, individuals will learn to understand the process of thinking used so far and to interpret new thoughts or revise existing ones in their life experiences to guide the individual's actions in the future. This presents two structures covering the framework and the objective point of view. The objective framework includes many new ideas, terminology, rules, and methods learned through experiential learning. The objective point of view affects all aspects of the whole, which are incorporated in the physical, thoughts and feelings, being able to take responsibility for oneself, and relationships with society, which are elements of a person's character.[24]

According to Bandura's theory, people with good self-efficacy can build their lives and, to some aspects, become unique gifts that are different for each person. However, this variable will be more skilled at using it when given in an exercise. For individuals to carry out self-management well, they need the confidence to find gaps in their skills. With this, they will be motivated to take part in training to implement the newly learned skills properly.[25]

Several previous studies have shown a significant effect of self-efficacy training on increasing patients' self-confidence. The study of self-efficacy training in postpartum bleeding patients showed a significant effect and increased the patient's self-confidence.[26] Another study regarding the program to increase self-efficacy to prevent pressure ulcers in patients with spinal cord injuries showed a significant effect. It increased the client's self-confidence compared to the group that did not receive the intervention.[27]

The study also obtained the average difference in self-efficacy scores before and after the intervention was comparable for the stress variable of 14.12. The same stressful event, which occurs in different individuals, will produce different effects. This is where the role of self-efficacy will present a difference in the effects of stress experienced by each individual. The level of self-efficacy of a person who tends to be high will experience less stress. This will allow him to do extraordinary things by using the various efforts within him to overcome every obstacle that exists so that he will be more assertive in dealing with problems.[13] On the other hand, stress in patients with diabetes mellitus harms the patient's self-efficacy. If a patient with diabetes mellitus experiences instability in the face of stressful conditions, this will lead to poor self-efficacy.[28]

Individuals will respond to their environment after assessing an event's significance and impact physiologically and cognitively evaluated social response and motivation.[29] Physiologically, the relationship between self-efficacy and stress is a hormone released by the central nervous system when under stress called catecholamines. When efficacy is moderate or low, the hormone will be released more rapidly to complete tasks and anticipate future problems.[30] In cognitive evaluation, individuals believe that a difficult task after a cognitive evaluation will trigger a stressful condition and vice versa. In social answers, If the other individual succeeds in providing a reasonable change effort professionally, then this individual will also be able to make that change. This will function as the existence of self-efficacy.[29] Regarding motivation, the individual's ability to view a task as an opportunity or a threat will affect the motivation to achieve it.[31]

This was supported by a previous study on self-efficacy training for female junior high school students showing a significant effect on students where good self-confidence will reduce students' stress levels in carrying out their education.[32] Therefore, efforts to control stress and optimize self-efficacy can be pursued simultaneously. This training shows significant results and is also supported by the education of respondents, the majority of whom have had education, and only one person who has never experienced it. Previous studies have shown that several characteristics support self-efficacy, and one of them is education.[33]

CONCLUSIONS AND RECOMMENDATION

Self-efficacy and self-management training helps increase self-efficacy in diabetes patients. This training can also reduce stress levels. The impact of increasing self-efficacy and reducing stress due to this training so that the quality of life of diabetic patients will be better, although this needs further research. It is recommended that this training be considered a nursing intervention to increase self-efficacy and reduce stress in patients with diabetes mellitus.

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